

Can a robotic disassembly system save electric vehicle batteries?

Credit: Jenny Woodbery/ORNL,U.S. Dept. of Energy Researchers at the Department of Energy's Oak Ridge National Laboratory have developed a robotic disassembly system for spent electric vehicle battery packs to safely and efficiently recycle and reuse critical materials while reducing toxic waste.

What can a disassembly system do for electric vehicle drive trains?

The team also see opportunities to apply the same kind of disassembly system to electric vehicle drive trains for recovery of materials such as rare earth magnets, copper, steel and intact power electronics.

How to design a battery disassembly system?

The design of the disassembly system must consider the analysis of potentially explosive atmospheres (ATEX) 1 of the area around the battery pack and, if necessary, adopt tools enabled to work in the corresponding ATEX zone.

How many batteries can a robotic disassembly system disassemble?

The automated system has been in development since July 2019 with several demonstrations and was developed as part of DOE's Critical Materials Institute. Thus far, the robotic disassembly process has disassembled a few dozen batteries, McIntyre said, concentrating instead on handling a variety of pack configurations.

How does a battery disassembly process work?

Based on the review of several literature sources, Tan et al. divided the battery disassembly process at the module-level into four steps. It starts with removing the battery casing, followed by the extraction of the battery management system (BMS), power electronics, and the thermal management system.

What is automated battery disassembly?

Automated disassembly reduces human exposure to toxic chemicals found inside the batteries and high power levels that are approaching the 900-volt level in some newer vehicles. The automated system, developed as part of DOE's Critical Materials Institute, or CMI, can be easily reconfigured to any type of battery stack.

In this paper, the mechanical characteristics, charging/discharging control strategies of switched reluctance motor driven large-inertia flywheel energy storage system are analyzed and ...

In the past few decades, electricity production depended on fossil fuels due to their reliability and efficiency [1]. Fossil fuels have many effects on the environment and directly ...

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critical ...

In this paper, the optimal disassembly strategy maximizes the optimal economic profit. It consists of the following decisions: (1) the optimal disassembly sequence, (2) the optimal disassembly depth, and (3) the optimal ...

The Future Of Energy Storage Beyond Lithium Ion . Over the past decade, prices for solar panels and wind farms have reached all-time lows. However, the price for lithium ion batteries, the ...

Scientists at Oak Ridge National Laboratory developed a robotic system that automates the disassembly of discarded electric vehicle batteries, making the process faster and safer, a report from...

Fault detection and diagnosis (FDD) is of utmost importance in ensuring the safety and reliability of electric vehicles (EVs). The EV's power train and energy storage, namely the electric motor drive and battery system, are ...

In addition to design and manufacturing, our team offers expertise in electric motor repair services, promoting motor efficiency, reliability, and longevity. With in-depth knowledge of industrial operating environments and requirements, ...

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2.2.1 Battery disassembly. The first step of battery disassembly is to remove the battery pack from the EV, which requires the use of a trailer to lift the drive wheels of the ...

With the help of advanced devices and successful application of AI techniques[23], the automatic disassemble process of retired battery pack can be achieved. 2.2 Waste battery classification ...

5. Electric Motor System Repair: repair processes, procedures, and specifications, including qualification of the repair shop for specific equipment types and sizes. The primary purpose is ...

Researchers at Oak Ridge National Laboratory developed a robotic disassembly system for used electric vehicle batteries to make the process safer, more efficient and less costly. ... It can be programmed to ...

Various studies show that electrification, integrated into a circular economy, is crucial to reach sustainable mobility solutions. In this context, the circular use of electric vehicle batteries (EVBs) is particularly relevant ...

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